

Claims

1. A breakaway torque wrench system, comprising:
  - a threaded member having a substantially circumferential outer surface and at least one axial groove defined in the circumferential outer surface;
  - a polymer breakaway torque wrench comprising:
    - a polymer arcuate engagement portion having an inner arcuate engagement surface and at least one protrusion extending from the inner arcuate engagement surface, at least a portion of the inner arcuate engagement surface adapted to confrontingly engage a portion of the circumferential outer surface, and the at least one protrusion adapted to insertably engage within the at least one axial groove of the threaded member;
    - and
    - wherein rotational movement of the engaged breakaway torque wrench correspondingly rotates the threaded member until a predefined torque level is reached and a portion of the arcuate engagement portion flexes causing the at least one protrusion to disengage from the at least one axial groove.
2. The system of claim 1, wherein the arcuate engagement portion is generally C-shaped.
3. The system of claim 1, wherein the breakaway torque wrench further includes a handle portion operably connected to the arcuate engagement portion.

4. The system of claim 3, wherein the handle portion includes a handle aperture therethrough adapted to receive a handle device to facilitate rotational actuation of the breakaway torque wrench.

5. The system of claim 1, wherein at least the arcuate engagement portion is constructed of a thermopolymer.

6. The system of claim 5, wherein the thermopolymer is a fluoropolymer.

7. The system of claim 1, wherein the threaded member is a thermopolymer fastener.

8. The system of claim 1, wherein the thermopolymer fastener is selected from a group consisting of: a bolt, a screw, threaded tubing, and a nut.

9. The system of claim 1, wherein the threaded member includes internal threading.

10. The system of claim 1, wherein the threaded member includes external threading.

11. A method of operating a polymer breakaway torque wrench, comprising the steps of:  
providing a polymer breakaway torque wrench including an arcuate engagement portion having an inner arcuate engagement surface and at least one tooth protrusion extending therefrom;

providing a polymer threaded fastening member having a substantially circumferential outer surface and at least one axial groove defined in the circumferential outer surface;

positionably engaging a portion of the inner arcuate engagement surface of the torque wrench around the circumferential outer surface of the threaded member such that the at least one tooth protrusion insertably engages the at least one axial groove of the object; and

rotating the torque wrench about the longitudinal axis of the threaded member to correspondingly rotate the threaded member until a predetermined torque level is obtained causing the at least one tooth protrusion to forceably disengage from the at least one axial groove of the threaded member.

12. The method of claim 11, wherein the step of providing a threaded member includes providing a threaded fastener having the at least one axial groove.

13. The method of claim 11, wherein rotating of the breakaway torque wrench about the longitudinal axis of the threaded member is facilitated by actuation of a handle portion of the breakaway torque wrench.

14. The method of claim 13, wherein the handle portion includes a handle aperture therethrough to facilitate rotation of the torque wrench.

15. A thermopolymer breakaway torque wrench comprising:
  - a thermopolymer handle portion;
  - a thermopolymer arcuate engagement portion operably attached to the handle portion and having
    - a thermopolymer inner arcuate engagement surface; and
    - at least one thermopolymer protrusion extending from the arcuate engagement surface adapted to insertably engage a threaded member having at least one axial groove defined therein such that the at least one protrusion insertably engages the at least one axial groove;
  - wherein rotational movement of the engaged breakaway torque wrench correspondingly rotates the threaded member until a predefined torque level is reached and a portion of the arcuate engagement portion flexes causing the at least one protrusion to disengage from the at least one axial groove.
16. The thermopolymer breakaway torque wrench of claim 15, wherein the handle portion includes a handle aperture therethrough adapted to receive a handle device to facilitate rotational actuation of the breakaway torque wrench.
17. The thermopolymer breakaway torque wrench of claim 15, wherein at least the thermopolymer arcuate engagement portion is constructed of a fluoropolymer.

18. The thermopolymer breakaway torque wrench of claim 15, wherein the thermopolymer breakaway torque wrench and the threaded member are constructed of a fluoropolymer.
19. The thermopolymer breakaway torque wrench of claim 15, wherein the arcuate engagement portion is generally C-shaped.
20. The thermopolymer breakaway torque wrench of claim 15, wherein the threaded member is constructed of a thermopolymer.
21. The thermopolymer breakaway torque wrench of claim 20, wherein the thermopolymer is a fluoropolymer.
22. The thermopolymer breakaway torque wrench of claim 15, wherein the threaded member is selected from a group consisting of: a bolt, a screw, threaded tubing, and a nut.
23. The thermopolymer breakaway torque wrench of claim 15, wherein the threaded member includes internal threading.
24. The thermopolymer breakaway torque wrench of claim 15, wherein the threaded member includes external threading.
25. A fluoropolymer breakaway torque wrench comprising:  
means for handling the breakaway torque wrench;

fluoropolymer arcuate engagement means operably attached to the handle portion for engaging a threaded member having axial grooves defined therein, the arcuate engagement means having

a fluoropolymer inner arcuate engagement surface; and

at least one fluoropolymer protruding means extending from the arcuate engagement surface for insertably engaging at least one of the axial grooves of the threaded member.

26. The fluoropolymer breakaway torque wrench of claim 25, wherein the means for handling includes a handle aperture therethrough adapted to receive a handle device to facilitate rotational actuation of the breakaway torque wrench

27. The fluoropolymer breakaway torque wrench of claim 25, wherein insertable engagement of the at least one protruding means within the at least one groove of the threaded member permits rotational movement such that rotational movement of the engaged breakaway torque wrench correspondingly rotates the threaded member until a predefined torque level is reached and a portion of the arcuate engagement means flexes causing the at least one protruding means to disengage from the at least one axial groove.

28. The fluoropolymer breakaway torque wrench of claim 25, wherein the arcuate engagement means is generally C-shaped.

29. The fluoropolymer breakaway torque wrench of claim 25, wherein the threaded member is selected from a group consisting of: a bolt, a screw, threaded tubing, and a nut.

30. The fluoropolymer breakaway torque wrench of claim 25, wherein the threaded member includes internal threading.

31. The fluoropolymer breakaway torque wrench of claim 25, wherein the threaded member includes external threading.